UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MATTHEW J. FAIRLIE, WILLIAM J. STEWART,
ANDREW T. B. STUART, STEVEN J. THORPE,
and CHARLIE DONG

Appeal 2008-5260
Application 10/829,434
Technology Center 1700

Decided: November 21, 2008

Before ADRIENE LEPIANE HANLON, TERRY J. OWENS, and CATHERINE Q. TIMM, *Administrative Patent Judges*.

HANLON, *Administrative Patent Judge*.

DECISION ON APPEAL

A. STATEMENT OF THE CASE

This is an appeal under 35 U.S.C. § 134 from an Examiner's rejection of claims 25-27, 29-31, 36, 38-43, 45-61, 63, 64, 66, and 82-103. Claims 104-128 are also pending in the application but have been withdrawn from consideration. We have jurisdiction under 35 U.S.C. § 6(b). We AFFIRM.

The Examiner rejected claims 25-27, 29-31, 36, 38-43, 45-61, 63, 64, 66, and 82-103 under 35 U.S.C. § 103(a) as unpatentable over the combination of Pritchard,[1] Scragg,[2] Campbell,[3] and Takriti.[4] Office Action mailed March 12, 2007, at 2-8.

The Examiner also rejected claims 25-27, 29-31, 36, 38-43, 45-61, 63, 64, 66, and 82-103 based on obviousness-type double patenting. Office Action mailed March 12, 2007, at 9. The Examiner withdrew the obviousness-type double patenting rejections in the Answer. Ans. 2.[5]

B. ISSUES

The Appellants do not point to any error in the Examiner's motivation to combine the teachings of Pritchard, Scragg, Campbell, and Takriti. Rather, the Appellants contend that once combined, the references do not teach or suggest a controller that receives and processes data pertaining to a demand for hydrogen as recited in claim 25. App. Br. 5-7.[6] The Appellants also contend that the Examiner has failed to specifically address features recited in dependent claims 36, 39-41, 43, and 45. App. Br. 7-8.

Thus, the issues on appeal are as follows:

Have the Appellants shown that the Examiner reversibly erred in concluding that the combined teachings of Pritchard, Scragg, Campbell, and Takriti teach or suggest a system comprising a controller that receives and processes data pertaining to a demand for hydrogen as recited in claim 25?

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[1] US 5,592,028 issued to Pritchard on January 7, 1997.
[2] US 4,084,038 issued to Scragg et al. on April 11, 1978.
[3] US 4,388,533 issued to Campbell et al. on June 14, 1983.
[4] US 6,021,402 issued to Takriti on February 1, 2000.
[5] Examiner's Answer mailed January 18, 2008.
[6] Appeal Brief dated November 6, 2007.

Have the Appellants shown that the Examiner reversibly erred in finding that the combined teachings of Pritchard, Scragg, Campbell, and Takriti teach or suggest the features recited in dependent claims 36, 39-41, 43, and 45?

C. FINDINGS OF FACT

The following findings of fact are supported by a preponderance of the evidence. Additional findings of fact as necessary appear in the Analysis portion of the opinion.

1. Claimed subject matter

Claim 25 is the only independent claim on appeal, and it reads as follows:

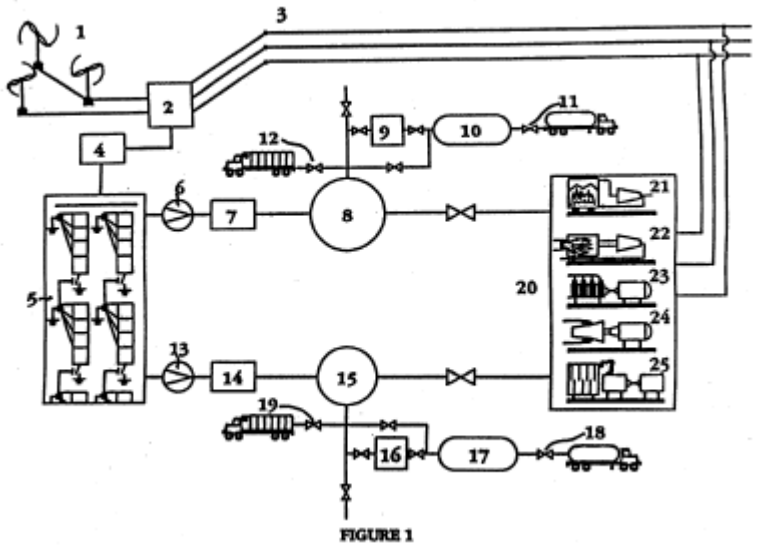
> An energy distribution network comprising:
>
> (a) at least one hydrogen generator for generating hydrogen using electric energy received from at least one source of electric energy;
>
> (b) at least one hydrogen storage reservoir for storing at least some of the hydrogen produced by said at least one hydrogen generator; and
>
> (c) at least one controller in communication with said at least one hydrogen generator and said at least one hydrogen storage reservoir for controlling the generation and storage of hydrogen, said at least one controller having a central processor and computer for receiving and processing data and for controlling the generation and storage of hydrogen based on said data, said data including data pertaining to a demand for hydrogen, data pertaining to availability of electric energy and data pertaining to the status of said at least one hydrogen generator.

App. Br. 11, Claims Appendix.

2. Pritchard

Pritchard discloses a system for providing electrical energy from wind. Pritchard 1:12-15.

Pritchard Figure 1 is a schematic diagram showing a wind farm combined with an electrolysis plant, an energy storage device, various combustion means and generating plant. Pritchard 2:44-46. Figure 1 is reproduced below:



Pritchard Figure 1 depicts a system for providing electrical energy from wind.

According to Pritchard, wind farm **1** provides electrical power via a switch/transformer **2** to either the public utility grid **3** or an AC-DC converter/filter **4**. Pritchard 2:56-59.

Any resultant DC output of the wind farm after being suitably filtered by the AC-DC converter/filter **4**, is fed to an electrolysis plant **5** where water is split into hydrogen and oxygen. The hydrogen produced passes through a pipe to a compressor **6** then into a purification plant **7** and then into hydrogen storage means **8**. Pritchard 2:60-65.

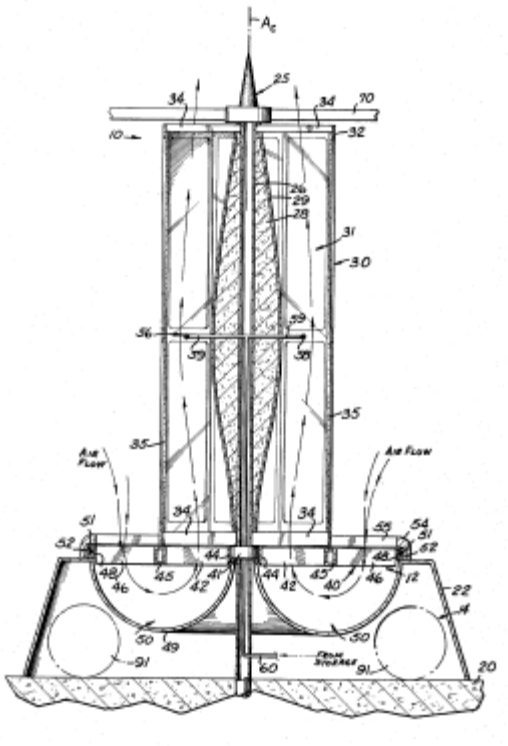
After passing into the hydrogen storage means **8**, the hydrogen may pass from the storage means **8** to a hydrogen combustion/electrical generation plant **20**. Alternatively, the hydrogen may pass from the storage means **8** through a purification/liquefaction plant **9** into long term storage means **10**. Pritchard 3:1-6.

Pritchard discloses that the system preferably includes control means to monitor and control the system. Pritchard 2:36-37.

3. Campbell

The invention disclosed in Campbell relates to solar powered electric power generator systems. Campbell 1:5-8.

The system includes a column unit illustrated in Campbell Figure 3. Campbell 2:47-48. Figure 3 is reproduced below:

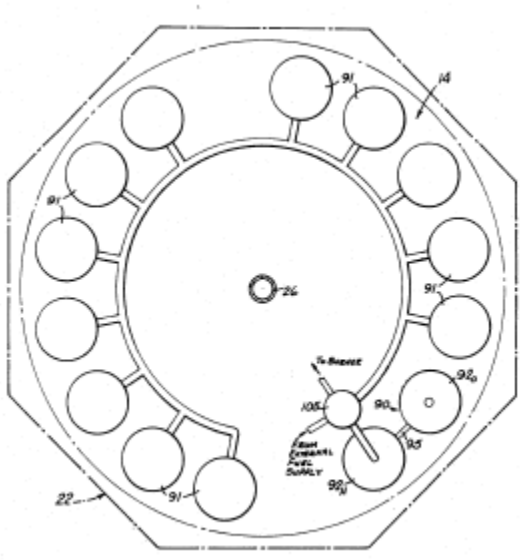


Campbell Figure 3 depicts a column unit of the system.

In particular, the system of the invention includes a column unit **10** in which air is heated to induce a flow of air therethrough, a mirror unit **11** for directing solar energy onto the column unit **10** to heat the air therein, and an electrical power generator unit **12** operatively associated with the column unit **10** so that the air flowing through the column unit **10** will drive the electric power generator unit **12**. Campbell 3:6-14.

The system of the invention also includes a fuel synthesis unit **14** operatively connected to the generator unit **12** to generate and store fuel while the generator unit **12** is being powered by the solar energy directed onto the column unit **10**. Campbell 3:14-18.

Campbell Figure 4 illustrates a fuel synthesis unit. Campbell 2:49-50. Figure 4 is reproduced below:



Campbell Figure 4 depicts a fuel synthesis unit.

The fuel synthesis unit includes a fuel generator **90** whose output is connected to a plurality of fuel storage tanks **91**. Campbell 7:24-26.

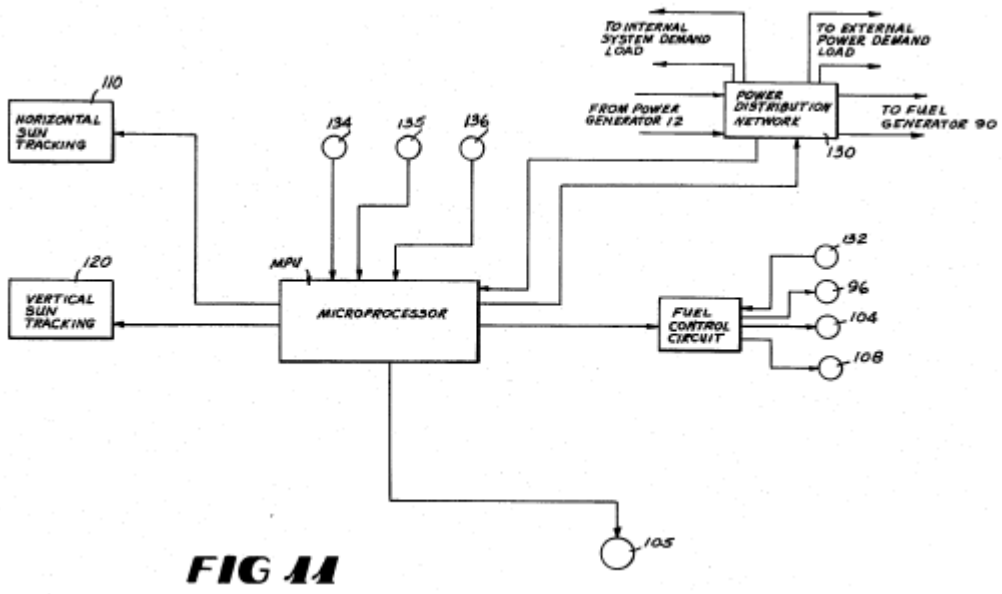
The fuel generator **90** is an electrolysis unit. Campbell 7:29-32.

To operate the fuel generator **90**, a DC voltage is required. Campbell 7:49-50.

Hydrogen is generated in the tank housing labeled $\mathbf{92}_{H}$. Campbell 7:56-66.

Hydrogen is stored in storage tanks **91**. Campbell 7:67-8:3.

Campbell Figure 11 is a schematic view illustrating overall control of the system. Campbell 2:64-65. Figure 11 is reproduced below:



Campbell Figure 11 depicts a schematic view of the overall control of the system.

As seen in Figure 11, the output from the electrical power generator unit **12** is connected to a power distribution network **130** which selectively connects the output of unit **12** to the external power demand load, the internal system demand load, and the fuel generator **90**. Campbell 11:38-43.

The network **130** monitors the output of the generator unit **12** and the external power demand load. When the output of generator unit **12** exceeds the external power demand load and the internal system demand load, the

network **130** supplies enough of the output of generator unit **12** to satisfy these demand loads and routes the remaining output to the fuel generator **90** to generate hydrogen for storage. Campbell 11:46-53.

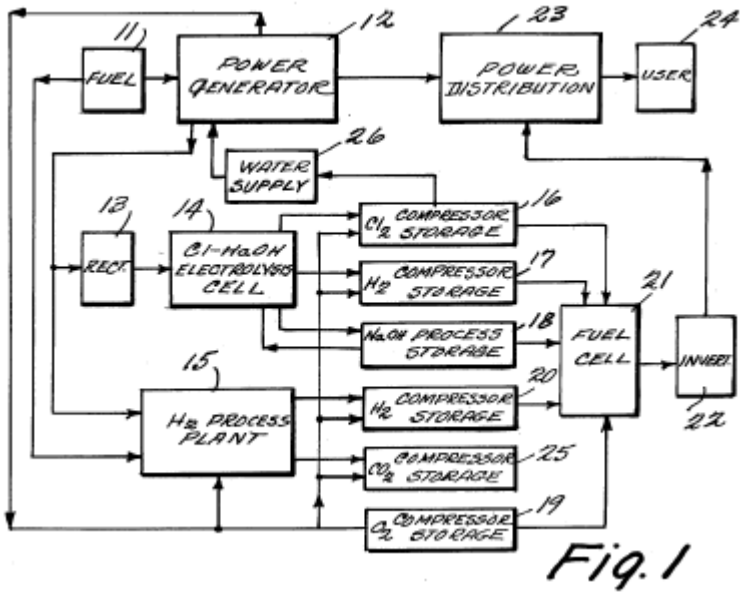
The overall operation of the system is controlled from a microprocessor MPU. Campbell 12:5-12.

The microprocessor is programmed so that when the solar isolation detected by sunlight monitor **134** is below a predetermined threshold level judged to be insufficient to provide any significant heating of the air in column unit **10**, the microprocessor MPU will disable the sun tracking control circuits **110** and **120**. If fuel level monitor **136** indicates hydrogen is available from storage tanks **91**, then the microprocessor MPU operates the distribution valve assembly **105** so that the hydrogen from tanks **91** is supplied to operate power generator unit **12**. The microprocessor MPU monitors the output of the generator unit **12**, the internal system demand load and the external power demand load and controls distribution valve assembly **105** so that just enough hydrogen is supplied to burner assembly **56** to operate the generator unit **12** so that its output equals the internal system demand load and the external power demand load. Campbell 12:13-34.

4. Scragg

Scragg discloses a process for generating and temporarily storing generated electrical energy during periods of less than peak demand in the form of electro-chemical, chemical, and electro-mechanical mediums. As the demand for electrical energy increases, the stored energy is reconverted back to AC electrical energy for use by consumers. Scragg 2:38-44.

Scragg Figure 1 illustrates an electrical power generation and storage system according to the disclosed invention. Scragg 3:26-28. Figure 1 is reproduced below:



Scragg Figure 1 depicts an electrical power generation and storage system.

A fuel source **11** provides fuel to an electric power generator **12**. The AC output of the power generator **12** is coupled to a power rectifier circuit **13**. The DC output of the power rectifier circuit **13** is coupled to a chlorine-sodium hydroxide electrolysis cell **14**. The rectified current sustains the electrolysis in cell **14** and converts saline water or brine to chlorine, hydrogen, and sodium hydroxide. The hydrogen may be stored in compressor storage tank **17**. Scragg 3:46-59.

5. Takriti

The invention disclosed in Takriti relates to a computer implemented process which provides generation levels, fuel usage, and prices at which power can be traded, given (1) a set of load forecasts on an electric system,

(2) a prediction of trading transactions that may take place within the next few days, (3) a description of the physical properties of the generating units, (4) an estimate of spot prices, and (5) fuel prices associated with load forecasts. Takriti 1:6-15.

D. PRINCIPLES OF LAW

A claimed invention is not patentable if the subject matter of the invention would have been obvious to a person having ordinary skill in the art at the time the invention was made. 35 U.S.C. § 103(a); *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007); *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 13 (1966).

Facts relevant to a determination of obviousness include (1) the scope and content of the prior art, (2) any differences between the claimed invention and the prior art, (3) the level of skill in the art, and (4) any relevant objective evidence of obviousness or non-obviousness. *KSR*, 127 S. Ct. at 1734; *Graham*, 383 U.S. at 17-18.

A person of ordinary skill is not an automaton but is a person of ordinary creativity. *KSR*, 127 S. Ct. at 1742. One of ordinary skill in the art is presumed to have skills apart from what the prior art references expressly disclose. *In re Sovish*, 769 F.2d 738, 742 (Fed. Cir. 1985).

Where a rejection is based on a combination of references, one cannot show non-obviousness by attacking the references individually. *In re Keller*, 642 F.2d 413, 426 (CCPA 1981).

E. ANALYSIS

1. Claim 25

The Examiner found that Pritchard discloses a system that includes at least one control means to monitor and control the system. Pritchard 2:37-

38; Ans. 6 (distinguishing the control means described in column 2, lines 37-38 from the means to monitor the electrolysis cells described in column 2, lines 22-24 of Pritchard). However, the Examiner found that Pritchard does not disclose the details of the control means. Ans. 6.

The Examiner found that Campbell discloses a system comprising a microprocessor that is in communication with at least one hydrogen generator and at least one hydrogen storage reservoir. The Examiner found that the microprocessor receives and processes data for controlling the generation and storage of hydrogen, including data pertaining to a demand for hydrogen. Ans. 7-9.

The Appellants argue that Campbell does not "specifically disclose that the microprocessor is in communication with the hydrogen storage 91." Reply Br. 2.[7]

Campbell discloses that the microprocessor is in communication with fuel monitor **136**. *See, e.g.,* Campbell 12:10-12; Campbell Figure 11. In operation:

> If the fuel level monitor **136** indicates hydrogen is available from storage tanks **91**, then the microprocessor MPU operates the distribution valve assembly **105** so that the hydrogen from tanks **91** is supplied to burner assembly **56** for burning in air passage **31** to heat the air and operate power generator unit **12**. The microprocessor MPU monitors the output of the generator unit **12**, the internal system demand load and the external power demand load and controls distribution valve assembly **105** so that just enough hydrogen is supplied to burner assembly **56** to operate the generator unit **12** so that its output equals the internal system demand load and the external power demand load.

[7] Reply Brief dated March 17, 2008.

Campbell 12:21-34; *see also* Ans. 8.

Thus, it is reasonable to find that the microprocessor disclosed in Campbell is in communication with hydrogen storage tanks **91** via either fuel level monitor **136** or distribution valve assembly **105**.

2. Claim 36

The Examiner found that Pritchard discloses that the system can process data pertaining to the availability of electric energy, such as the amount of electric energy available. Ans. 6, 11; Pritchard 4:34-37; *see also* Campbell 11:46-53.

The Appellants have failed to direct us to any error in the Examiner's findings. Rather, the Appellants argue that "the Examiner has failed to show how the prior art of record teaches or suggests each element of the claim." Reply Br. 3.

Claim 36 recites a Markush group. The disclosure in the prior art of a species within a Markush group renders the Markush group unpatentable. *See In re Harnisch*, 631 F.2d 716, 719-20 (CCPA 1980) ("'Markush' was the name of an applicant for patent . . . who happened to use in a claim a type of definition of a genus or subgenus by enumeration of species . . . ."); *Atlas Powder Co. v. IRECO Inc.*, 190 F.3d 1342, 1346 (Fed. Cir. 1999) (a single prior art species within a claimed genus anticipates the genus). Significantly, the Appellants do not dispute that Pritchard teaches or suggests at least one species within the Markush group recited in claim 36.

3. Claim 39

The Examiner found that Pritchard discloses a compressor **6** operably connected to a hydrogen generator (electrolysis plant **5**) and hydrogen

storage means **8**. Ans. 6; Pritchard Figure 1. The Appellants have failed to point to any error in the Examiner's finding.

4. Claims 40 and 41

The Examiner found that a system controller in Pritchard would monitor data pertaining to the status of hydrogen in storage means **8** and **10** to facilitate the transfer of hydrogen from short-term storage means **8** to long-term storage means **10** and vice versa. The Examiner found that such a controller would monitor a minimum threshold, such as the hydrogen pressure or the amount of hydrogen in the storage means. Ans. 12.

The Appellants argue that Pritchard fails to teach or suggest such a system controller. The Appellants argue that the Examiner's position appears to be based on inherency, and inherency is not a substitute for some teaching or suggestion in support of an obviousness rejection. Reply Br. 3.

The Appellants' argument is not persuasive of reversible error. We interpret the Examiner's findings as relying on the knowledge of the skilled artisan rather than inherency. *See Sovish*, 769 F.2d at 742; *In re Bozek*, 416 F.2d 1385, 1390 (CCPA 1969) (conclusion of obviousness may be based on the common knowledge and common sense of the person of ordinary skill in the art without any specific hint or suggestion in a particular reference).

The record before us establishes that it was known to use a controller or microprocessor to control the generation and storage of hydrogen. *See, e.g.,* Campbell 11:46-53. We find that it would have been within the skill of the ordinary artisan to maintain sufficient hydrogen storage by initiating or increasing hydrogen production when hydrogen storage falls below a certain level. We find that one of ordinary skill in the art would have known that this level may be measured several ways, including measuring the hydrogen

pressure or the amount of hydrogen in a storage reservoir. The Appellants have failed to establish otherwise.

5. Claim 43

The Examiner found that the microprocessor disclosed in Campbell would have been expected to have some form of operator interface, such as a keyboard, so that it can be programmed. Ans. 12.

The Appellants do not point to any error in the Examiner's finding that the microprocessor disclosed in Campbell would have been expected to have an operator interface. Rather, the Appellants argue that "there is no teaching or suggestion in the prior art of record of a user activation interface for receiving data concerning a demand for hydrogen as claimed." Reply Br. 3.

As discussed above, the system disclosed in Campbell includes a microprocessor that receives and processes data for controlling the generation and storage of hydrogen, including data pertaining to a demand for hydrogen. Ans. 7-9. We find that one of ordinary skill in the art would have expected an operator interface to be useful for receiving such data. *Sovish*, 769 F.2d at 742; *Bozek*, 416 F.2d at 1390.

6. Claim 45

The Examiner found that Pritchard, Campbell, and Scragg show that the demand for electricity and the ability to produce electricity from one or more sources varies over a period of time. The Examiner also found that Takriti teaches that it is useful to forecast or predict various aspects of producing electricity to manage costs. Ans. 12.

The Appellants do not point to any error in the Examiner's findings. Rather, the Appellants argue that "the Examiner has not shown how each of

the elements of the claimed group is taught or suggested by the prior art of record." Reply Br. 3.

Claim 45 recites a Markush group. As discussed above, the disclosure in the prior art of a species within a Markush group renders the Markush group unpatentable. *See Harnisch*, 631 F.2d at 719-20; *Atlas Powder*, 190 F.3d at 1346. Significantly, the Appellants do not dispute that Pritchard, Campbell, Scragg, and/or Takriti teach or suggest at least one species within the Markush group recited in claim 45.

7. Examiner's objection

The Appellants disagree with the Examiner's objection to the title of the invention. App. Br. 4. This matter is petitionable rather than appealable. *See* MPEP § 1002.02(c) (8th ed., Rev. 7, July 2008). Thus, the matter is not properly decided in this appeal.

F. CONCLUSIONS OF LAW

The Appellants have not shown that the Examiner reversibly erred in concluding that the combined teachings of Pritchard, Scragg, Campbell, and Takriti teach or suggest a system comprising a controller that receives and processes data pertaining to a demand for hydrogen as recited in claim 25.

The Appellants have not shown that the Examiner reversibly erred in finding that the combined teachings of Pritchard, Scragg, Campbell, and Takriti teach or suggest the features recited in dependent claims 36, 39-41, 43, and 45.

G. DECISION

The rejection of claims 25-27, 29-31, 36, 38-43, 45-61, 63, 64, 66, and 82-103 under 35 U.S.C. § 103(a) as unpatentable over the combination of Pritchard, Scragg, Campbell, and Takriti is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a) (2008).

AFFIRMED

PL INITIAL:
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